HARDEN RESERVOIR

Parke County

2006 Fish Management Report

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EXECUTIVE SUMMARY

- Harden Reservoir, commonly referred to as Raccoon Lake, is a 2,060-acre U.S. Army Corps of Engineers flood control impoundment located approximately 7 mi east of Rockville, Indiana in Parke County.

- A fishery survey was conducted May 8 to 18, 2006 to evaluate the predator/prey balance and determine the age of dominant sportfish. A striped bass evaluation was conducted from October 23 to 26, 2006 to determine stocking success and assess the development of the striped bass fishery.

- Overall, 4,897 fish representing 23 species and hybrid sunfish were collected with an estimated weight of 1,433 lbs. The three most abundant species collected by number were gizzard shad (53%), bluegill (20%), and spotfin shiner (6%). The three most abundant species collected by weight were striped bass (21%), gizzard shad (18%), and common carp (15%).

- A total of 2,570 gizzard shad was collected that weighed 260 lbs. The relative abundance of gizzard shad increased from 27 to 53% between 2001 and 2006. Gizzard shad ranged in length from 4.0 to 10.9 in and averaged 6.8 in. Age-1 and age-2 shad comprised 46 and 50%, respectively, of the shad collected.

- Altogether, 967 bluegill that weighed roughly 83 lbs were collected. Bluegill ranged in length from 1.8 to 7.9 in and averaged 3.9 in. Twenty-nine percent of the bluegill collected were 6 in or greater. Forty-three percent of the bluegill collected were age 1, 23% were age 2, and 21% were age 3.

- One hundred ninety-five largemouth bass that were estimated to weigh 202 lbs were collected. Largemouth bass ranged in length from 1.1 to 19.9 in and averaged 11.1 in. The percentage of harvestable bass (16 in or greater) was 18%. Approximately 27% of the largemouth bass collected were age 1, 14% were age 2, and 16% were age 3.

- Twenty-two striped bass were collected during the standard fisheries survey and estimated to weigh 331 lbs. Striped bass ranged in length from 9.2 to 37.4 in. The average length of striped bass was 28.9 in.

- A total of 139 striped bass weighing 98.52 lbs was collected during the fall evaluation. Overall, 132 young-of-the-year (YOY) striped bass averaging 3.8 in were collected via electrofishing (24.3/h).

- In order to maintain predatory pressure on gizzard shad and provide a quality striped bass fishery, annual stockings of striped bass should continue at a rate of 10 fingerlings/acre (20,600 total).

- The next striped bass evaluation is scheduled for 2008 and the next fisheries survey is scheduled for 2010.

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INTRODUCTION

Harden Reservoir, commonly referred to as Raccoon Lake, is a 2,060-acre U.S. Army Corps of Engineers flood control impoundment. Harden Reservoir is located approximately 7 mi east of Rockville, Indiana in Parke County.

Harden Reservoir supports an abundant forage base composed primarily of gizzard shad. This forage base has been utilized by stocking striped bass. Striped bass occupy open water and feed heavily on gizzard shad. Since the inception of the striped bass stockings in 1994, fishermen have reported catching fish in excess of 30 lbs. Striped bass stockings have been evaluated regularly to determine their success.

In 1996, an increase in the minimum length limit for largemouth bass from 14 to 16 in was implemented. Largemouth bass sampling and creel surveys have been conducted to determine if the increased minimum length limit was effective at increasing the proportion of bass 14 in and larger. Overall, the number of largemouth bass over 14 in, and over 16 in, has increased since the 16-in minimum length limit was established.

The last fisheries survey at Harden Reservoir was conducted in 2001. Gizzard shad, the most abundant species collected, comprised 27% of the fish. Bluegill ranked second in abundance by number and over 70% were 6 in and larger. Largemouth bass, channel catfish, white bass, and crappie (black and white) were also collected during the 2001 survey.

The 2006 fisheries survey was conducted to evaluate the fish community in Harden Reservoir. A fall evaluation was conducted to assess the striped bass fishery.

METHODS

Standard Fisheries Survey

The standard fisheries survey was conducted from May 8 to 18, 2006. Physical and chemical characteristics, excluding a Secchi disk reading and conductivity, were collected in the deepest area of the lake according to the DFW sampling guidelines (Shipman 2001).

Fish were collected using four sampling gears. Pulsed DC night, shoreline electrofishing was conducted for 2.75 h with two dippers. Eleven trap nets, 11 standard gill nets, and 11 large (striped bass) gill nets were fished overnight. All fish collected were measured to the nearest 0.1 in TL. Average weights for Fish Management District 5, or length-weight regressions were used to estimate the weight of all fish collected. Scales were taken from the dominant sportfish and gizzard shad for age and growth analysis. Proportional stock density (PSD) was calculated for

largemouth bass and bluegill (Anderson and Neumann 1996). The Bluegill Fishing Potential Index (BGFP), developed by Ball and Tousignant, 1996, was utilized to describe the bluegill fishing opportunities at Harden Reservoir.

Fall Evaluation

A striped bass evaluation was conducted from October 23 to 26, 2006. Pulsed DC night, shoreline electrofishing totaled 5.43 h and 16 large gill nets were fished overnight. All fish collected were measured to the nearest 0.1 in TL and weighed to the nearest 0.01 lb (for fish up to 5.0 lbs) or 0.25 lb (for fish over 5.0 lb). Scales were taken for age and growth analysis. In addition to striped bass, walleye were also collected to document the occurrence of natural reproduction.

RESULTS

Standard Fisheries Survey

The surface temperature at Harden Reservoir on May 8 was 65.9 ºF and 52.9 ºF at 46 feet. Alkalinity was 68.4 mg/L at both the surface and 46 ft.

Overall, 4,897 fish representing 23 species and hybrid sunfish were collected with an estimated weight of 1,433 lbs. The five most abundant species collected by number were gizzard shad (53%), bluegill (20%), spotfin shiner (6%), longear sunfish (6%), and largemouth bass (4%). The five most abundant species collected by weight were striped bass (21%), gizzard shad (18%), common carp (15%), largemouth bass (14%), and channel catfish (12%).

A total of 2,570 gizzard shad was collected that weighed 260 lbs. The relative abundance of gizzard shad increased from 27 to 53% between 2001 and 2006. The catch rate (CPUE) of gizzard shad was 29.5/standard gill net lift, 20.5/striped bass gill net lift, and 14.9/trap net lift. Electrofishing yielded a CPUE of 675.6 shad/h, an increase from 474.0/h in 2001. Gizzard shad ranged in length from 4.0 to 10.9 in and averaged 6.8 in. Ninety-seven percent of the gizzard shad collected were between 5.5 and 8.0 in long. Age-1 and age-2 gizzard shad comprised 46 and 50%, respectively, of the shad collected. In 2001, no age-1 gizzard shad were collected and age-2 shad dominated the sample, accounting for over 75% of the shad collected (Wisener 2002).

Altogether, 967 bluegill that weighed roughly 83 lbs were collected. Bluegill was the second most abundant species collected by number (20%) and the sixth most abundant by weight (6%). Electrofishing yielded a CPUE of 282.2 bluegill/h. Bluegill ranged in length from 1.8 to

7.9 in and averaged 3.9 in. Twenty-nine percent of the bluegill collected were 6 in or greater, which was down from 70% reported in 2001. Bluegill PSD was 22. The BGFP score was 15, which ranks the bluegill fishery as fair. Forty-three percent of the bluegill collected were age 1, while 23 and 21% were ages 2 and 3, respectively.

Longear sunfish ranked fourth in abundance by number (6%) with 271 fish collected. Longear ranged in length from 2.1 to 6.0 in and averaged 4.4 in. Due to their small size, longear are usually of little interest to panfish anglers.

One hundred ninety-five largemouth bass were collected and accounted for 4% of the sample by number. Largemouth bass were estimated to weigh 202 lbs, which ranked them fourth in abundance by weight (14%). Largemouth bass ranged in length from 1.1 to 19.9 in and averaged 11.1 in. Largemouth bass PSD was 84, which was up from 75 in 2001. Bass 14 in and larger were collected at a CPUE of 25.1 bass/h and bass 16 in and larger were collected at a CPUE of 12.4/h. This was slightly lower but similar to 2001 when largemouth 14 in and larger were collected at a CPUE of 32.7/h and bass 16 in and larger were collected at 15.4/h. The percentage of harvestable bass (16 in or larger) was 18% in both 2001 and the present survey. Approximately 27% of the largemouth bass collected were age 1, 14% were age 2, and 16% were age 3.

A total of 152 channel catfish was collected. Channel catfish weighed 178 lbs and ranked fifth in abundance by weight (12%). Channel catfish ranged in length from 5.5 to 29.2 in and averaged 13.6 in. Fifty-eight percent of the channel catfish collected were considered harvestable (12 in or larger). Fairly consistent reproduction and recruitment is evident from the length distribution of the fish collected. The two largest channel catfish exceeded 29.0 in and were estimated to weigh nearly 12 lbs each.

Black and white crappie each accounted for approximately 2% of the fish collected compared to 3% each in 2001. Black crappie ranged in length from 4.1 to 9.1 in and averaged 7.5 in. White crappie averaged 8.0 in and ranged in length from 6.3 to 10.6 in. Only 7% of black crappie were considered harvestable (8.5 in or larger) while 35% of white crappie were harvestable. The relative abundance of harvestable crappie has decreased since 2001 when 21% of black crappie and 53% of white crappie were considered harvestable (Wisener 2002). Age-2 fish represented 68 and 69%, respectively, of the black and white crappie collected.

Even though only 99 common carp were collected (2% of the sample by number) they ranked third in abundance by weight (15%). Carp ranged in length from 9.5 to 26.6 in and averaged 16.6 in.

Twenty-two striped bass were collected weighing an estimated 307 lbs, ranking them the most abundant species collected by weight (21%). Striped bass ranged in length from 9.2 to 37.4 in. The average length of striped bass was 28.9 in, which was a large increase from 19.0 in in 2001. Stripers up to at least age 8 were collected.

Twenty white bass were collected ranging in length from 5.0 to 15.0 in. The relative abundance of white bass fell from 6% (176 fish) in 2001 to less than 1% in 2006. White bass from age 1 through age 5 were collected.

Twelve other species were collected that accounted for 9% of the sample by number and 8% by weight. Spotfin shiner, green sunfish, and golden redhorse were the most numerous of these species. Quillback, golden redhorse, and flathead catfish accounted for the majority of the weight. Flathead catfish were large enough to be of interest to anglers. The largest flathead collected measured 26.1 in and was estimated to weigh 7.5 lbs.

Fall Evaluation

A total of 139 striped bass weighing 98.52 lbs was collected. Overall, 132 young-of-the-year (YOY) stripers were collected electrofishing at a rate of 24.3 YOY/h. The YOY CPUE of striped bass in 1999 and 2002 was 37.3 and 46.7 YOY/h, respectively. In 2006, YOY averaged just 3.8 in which was the smallest average length ever recorded for YOY striped bass at Harden Reservoir (Table 1). The remaining seven striped bass collected during the fall evaluation ranged in length from 23.1 to 35.5 in and weighed a total of 94.96 lbs. Adult striped bass gill net CPUE was 0.4 stripers/lift, which was down from 2004 when the CPUE for adult striped bass was 2.4/lift.

Three walleye were also collected during the fall evaluation. Walleye ranged in length from 17.1 to 24.0 in with the largest weighing just over 5 lbs. All three walleye were the result of natural reproduction. The last walleye stocking by the DFW at Harden Reservoir occurred in 1996.

DISCUSSION

The increase in gizzard shad CPUE between 2001 and 2006 (474 and 676 shad/h, respectively) can likely be attributed to the large number of age-1 shad collected in 2006. Gizzard shad continues to be the most abundant species at Harden Reservoir. Age-1 and age-2 shad made up 97% of the collection in 2006 whereas in 2001 no age-1 shad were collected and 75% of shad were age 2. Gizzard shad will continue to provide a good forage base for striped bass since most were between 5.5 and 8.0 in.

The CPUE of largemouth bass 14 in and larger and 16 in and larger was similar between 2001 and 2006. Younger year classes of bass (ages 1 through 4) were also well represented suggesting that recruitment has been consistent over the past several years. As larger fish are removed from the population, the high PSD (84) will likely decline but the 16-in minimum length limit should continue to produce a quality bass fishery.

Striped bass continue to thrive at Harden Reservoir. Striped bass have provided an excellent fishing opportunity with numerous reports of stripers being caught in excess of 30 lbs. The fall evaluation revealed that the 2006 year class of striped bass was well represented. Young-of-the-year striped bass averaged just 3.8 in which was the smallest average length ever recorded during a fall evaluation (Table 1). Harden Reservoir was stocked with twice the number of striped bass fingerlings requested in 2006 (41,240 total). Additionally, the average length of striped bass fingerlings at stocking was 1.08 in, which was the smallest average size ever stocked (Table 1). The small size at stocking and increased competition likely contributed to the low average length of YOY striped bass observed during the fall evaluation. In order to maintain predatory pressure on gizzard shad and provide a quality striped bass fishery, annual stockings of striped bass should continue at a rate of 10 fingerlings/acre (20,600 total). The next fall evaluation of striped bass is scheduled for 2008.

The next standard fisheries survey for Harden Reservoir is scheduled for 2010. The 2006 survey showed that Harden Reservoir is providing anglers with many different fishing opportunities. Largemouth bass fishing should be good with many fish over the 16-in minimum length limit. Anglers are encouraged to practice catch and release of bass to maintain this fishery. Anglers should also have success targeting bluegill, crappie, and channel catfish. Limited natural reproduction of walleye has produced a few quality fish over the years. However, for those anglers who want to test their strength, striped bass would be the species to

target. These fish have become renowned for their overall strength and fighting ability. Even though there is no minimum length limit for striped bass, the creel limit is 2 fish/angler/day.

RECOMMENDATIONS

- In order to maintain predatory pressure on gizzard shad and provide a quality striped bass fishery, annual stockings of striped bass should continue at a rate of 10 fingerlings/acre (20,600 total).

- The next striped bass evaluation is scheduled for 2008 and the next fisheries survey is scheduled for 2010.

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Submitted by: Christopher C. Long, Assistant Fisheries Biologist
Date: March 30, 2007

Approved by: J. Rhett Wisener, Fisheries Biologist

Approved by: Brian M. Schoenung, Fisheries Supervisor

Date: August 15, 2007

Table 1. Striped bass stocking data and young-of-the-year (YOY) collection data in years when fall evaluations were conducted at Harden Reservoir, 1994 to 2006.

Year	Number stocked	Average size at stocking (in)	YOY CPUE (f/h)	Average YOY size (in)
1994	20,600	1.40	69.3	5.2
1995	No stocking			
1996	41,200	1.34		
1997	20,600	1.28	6.2	4.9
1998	20,606	1.34	9.5	6.0
1999	20,700	1.96	37.3	4.5
2000	No stocking			
2001	20,600	1.40		
2002	20,600	1.60	46.7	4.9
2003	17,683	1.25		
2004	No stocking			
2005	20,600	1.85		
2006	41,240	1.08	24.3	3.8

LAKE SURVEY REPORT

Type of Survey: [ ] Initial Survey [x] Re-Survey

Lake Name	County	Date of survey (Month, day, year)
Harden Reservoir	Parke	5/8-18/06, 6/6/06, 10/23-26/06
Biologist's name		Date of approval (Month, day, year)
Christopher C. Long		8/15/2007

LOCATION

Quadrangle Name	Range	Section
Bellmore, Mansfield	6W	10, 15, 16, 20, 21, 22, 27, 28
Township Name	Nearest Town	
15N	Hollandsburg	

ACCESSIBILITY

State owned public access site	Privately owned public access site	Other access site
Five boat ramps		

Surface acres	Maximum depth	Average depth	Acre feet	Water level	Extreme fluctuations
2,060	50 ft	24 ft	49,300	661 MSL	50' Flood

Location of benchmark: BM 728, T15N, R6W, S9, SW1/4, NE1/4

INLETS

Name	Location	Origin
Big Raccoon Creek	Northeast	T16N, R5W, S31
Ramp Creek	Northeast	T16N, R5W, S27
Byrd Creek	North	T16N, R5W, S31

OUTLETS

Name	Location
Big Racoon Creek	South

Water level control: Concrete tube 10'x10' with three, 4'x8' slide gates

POOL	ELEVATION (Feet MSL)	ACRES
TOP OF DAM	712	
TOP OF FLOOD CONTROL POOL	690	3,910
TOP OF CONSERVATION POOL	661	2,060
TOP OF MINIMUM POOL	640	1,100
STREAMBED	613	

Bottom type

[ ]	Boulder
[x]	Gravel
[x]	Sand
[x]	Muck
[x]	Clay
[ ]	Marl

Watershed use: Varied agriculture, timber, and pasture. Some small towns and residential housing.

Development of shoreline: Five public boat ramps, a large camping area, swimming beach, and several private docks and beaches.

Previous surveys and investigations:

Fisheries surveys; 1962-65, 1967-71, 1973-76, 1978, 1980, 1983, 1985, 1987, 1988, 1991, 1997, and 2001.

Largemouth bass population estimates; 1994, 1995, 1997, and 1998.

Fall evaluations; 1994, 1995, 1997, 1998, 1999, 2002, and 2004.

Angler surveys; 1972-75, 1978, 1980, 1986, 1994, 1995, 1997, 1998, and 2004.

STANDARD SURVEY SAMPLING EFFORT					
ELECTROFISHING	Day hours		Night hours 2.75		Total hours 2.75
TRAP NETS	Number of traps 11		Number of Lifts 1		Total effort 11 lifts
GILL NETS	Number of nets STD = 11 / STB = 11		Number of Lifts STD = 1 / STB = 1		Total effort 22 lifts
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS	
Color	Turbidity Feet Inches
Alkalinity (ppm)* Surface: 68.4 Bottom: 68.4	pH Surface: 9.0 Bottom: 9.0
Conductivity: microsiemens	Air temperature: °F
Water chemistry GPS coordinates: N W	

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)
SURFACE	65.9	14.5	36	57.9	4.6	72		
2	65.6	14.6	38	57.3	4.1	74		
4	65.0	14.3	40	56.0	3.8	76		
6	64.7	13.7	42	54.9	3.5	78		
8	64.5	12.8	44	53.7	3.1	80		
10	64.3	11.6	46	52.9	2.7	82		
12	63.4	9.7	48			84		
14	62.5	8.4	50			86		
16	61.9	7.6	52			88		
18	61.5	7.2	54			90		
20	61.2	6.9	56			92		
22	61.0	6.7	58			94		
24	60.7	6.4	60			96		
26	60.4	6.2	62			98		
28	59.8	5.5	64			100		
30	59.4	5.3	66					
32	59.0	5.1	68					
34	58.4	4.7	70					

COMMENTS

*ppm-parts per million

SPECIES AND RELATIVE ABUNDANCE OF FISHES COLLECTED BY NUMBER AND WEIGHT					
*COMMON NAME OF FISH	NUMBER	PERCENT	LENGTH RANGE (inches)	WEIGHT (pounds)	PERCENT
Gizzard shad	2,570	52.5	4.0 - 10.9	259.93	17.9
Bluegill	967	19.7	1.8 - 7.9	83.41	5.7
Spotfin shiner	274	5.6	2.3 - 3.6	3.55	0.2
Longear sunfish	271	5.5	2.1 - 6.0	17.08	1.2
Largemouth bass	195	4.0	1.1 - 19.9	202.12	13.9
Channel catfish	152	3.1	5.5 - 29.2	177.50	12.2
Black crappie	107	2.2	4.1 - 9.1	22.57	1.6
Common carp	99	2.0	9.5 - 26.6	220.54	15.2
White crappie	74	1.5	6.3 - 10.6	16.76	1.2
Green sunfish	39	0.8	2.9 - 7.5	4.39	0.3
Golden redhorse	27	0.6	8.7 - 22.5	34.66	2.4
Quillback	27	0.6	7.8 - 18.7	47.54	3.3
Striped bass	22	0.4	9.2 - 37.4	306.52	21.1
White bass	20	0.4	5.0 - 15.0	11.54	0.8
Bluntnose minnow	16	0.3	2.5 - 3.2	0.17	< 0.1
Golden shiner	8	0.2	4.3 - 11.2	1.12	0.1
Northern hogsucker	7	0.1	7.1 - 9.5	1.60	0.1
Goldfish	5	0.1	10.0 - 15.8	6.09	0.4
Brook silverside	5	0.1	3.6 - 4.2	0.05	< 0.1
Flathead catfish	3	0.1	5.9 - 26.1	14.72	1.0
Yellow bullhead	3	0.1	4.8 - 9.1	0.80	0.1
Brown bullhead	2	< 0.1	9.3 - 9.5	0.58	< 0.1
Hybrid sunfish	2	< 0.1	5.5 - 6.5	0.34	< 0.1
Logperch	2	< 0.1	4.2	0.06	< 0.1
Total	4,897			1,433.64	

*Common names of fishes recognized by the American Fisheries Society.

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF Gizzard shad									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0	7	0.3	0.03	1	22.0				
4.5					22.5				
5.0					23.0				
5.5	157	6.1	0.05	1	23.5				
6.0	708	27.5	0.07	1, 2	24.0				
6.5	940	36.6	0.09	1, 2	24.5				
7.0	215	8.4	0.11	1, 2	25.0				
7.5	252	9.8	0.14	2	25.5				
8.0	214	8.3	0.17	2, 3	26.0				
8.5	47	1.8	0.21	2, 3	TOTAL	2,570			
9.0	18	0.7	0.24	2, 3, 4					
9.5	3	0.1	0.29	2, 3					
10.0	1	< 0.1	0.34	3					
10.5	8	0.3	0.39	3					
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	675.6/hr	GILL NET CATCH	STD = 29.5/lift STB = 20.5/lift	TRAP NET CATCH	14.9/lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF Bluegill									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	1	0.1	0.01	1	19.5				
2.0	12	1.2	0.01	1	20.0				
2.5	99	10.2	0.01	1	20.5				
3.0	167	17.2	0.02	1	21.0				
3.5	111	11.5	0.03	1	21.5				
4.0	109	11.3	0.04	1, 2, 3	22.0				
4.5	49	5.0	0.06	2	22.5				
5.0	62	6.4	0.08	2, 3	23.0				
5.5	76	7.8	0.11	2, 3	23.5				
6.0	111	11.5	0.15	2, 3, 4	24.0				
6.5	95	9.8	0.20	3, 4, 5	24.5				
7.0	60	6.2	0.25	3, 4	25.0				
7.5	15	1.6	0.31	3, 4, 5	25.5				
8.0					26.0				
8.5					TOTAL	967			
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	282.2/hr	GILL NET CATCH	STD = 0.2/lift STB = 0/lift	TRAP NET CATCH	17.0/lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF Largemouth bass									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0	3	1.5	0.01	YOY	19.0	2	1.0	3.82	
1.5					19.5	2	1.0	4.19	
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5	3	1.5	0.02	1	21.5				
4.0	5	2.6	0.03	1	22.0				
4.5	13	6.7	0.04	1	22.5				
5.0	14	7.2	0.05	1	23.0				
5.5	12	6.2	0.07	1, 2	23.5				
6.0	8	4.1	0.09	2	24.0				
6.5	10	5.1	0.12	1, 2	24.5				
7.0	2	1.0	0.15	1	25.0				
7.5	1	0.5	0.19	not aged	25.5				
8.0	1	0.5	0.23	2	26.0				
8.5	1	0.5	0.28	2	TOTAL	195			
9.0	2	1.0	0.33	2, 3					
9.5	3	1.5	0.40	2					
10.0	6	3.1	0.46	2, 3					
10.5	1	0.5	0.54	not aged					
11.0	3	1.5	0.63	2, 3					
11.5	2	1.0	0.72	3					
12.0	9	4.6	0.82	3, 4					
12.5	13	6.7	0.95	3					
13.0	5	2.6	1.08	3, 4					
13.5	7	3.6	1.20	3, 4, 5					
14.0	2	1.0	1.38	3, 4					
14.5	7	3.6	1.56	3, 4					
15.0	7	3.6	1.74	4, 5					
15.5	19	9.7	1.92	4, 5					
16.0	10	5.1	2.15	not aged					
16.5	5	2.6	2.36						
17.0	6	3.1	2.62						
17.5	4	2.1	2.84						
18.0	5	2.6	3.18						
18.5	2	1.0	3.54						

ELECTROFISHING CATCH	70.2/hr	GILL NET CATCH	STD = 0.1/lift STB = 0/lift	TRAP NET CATCH	0.1/lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF Channel catfish									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0	1	0.7	2.46	
1.5					19.5	2	1.3	2.69	
2.0					20.0	1	0.7	2.95	
2.5					20.5	1	0.7	3.09	
3.0					21.0	1	0.7	3.43	
3.5					21.5	1	0.7	3.73	
4.0					22.0	1	0.7	3.98	
4.5					22.5	3	2.0	4.53	
5.0					23.0	1	0.7	4.74	
5.5	1	0.7	0.04	not aged	23.5	1	0.7	5.23	
6.0	1	0.7	0.06		24.0	1	0.7	5.80	
6.5					24.5				
7.0					25.0				
7.5	3	2.0	0.11		25.5	1	0.7	6.99	
8.0	7	4.6	0.15		26.0	1	0.7	7.38	
8.5	4	2.6	0.17		26.5				
9.0	7	4.6	0.20		27.0				
9.5	4	2.6	0.23		27.5				
10.0	5	3.3	0.28		28.0				
10.5	15	9.9	0.33		28.5				
11.0	8	5.3	0.38		29.0	2	1.3	11.97	
11.5	9	5.9	0.43						
12.0	7	4.6	0.49		TOTAL	152			
12.5	10	6.6	0.56						
13.0	9	5.9	0.67						
13.5	8	5.3	0.73						
14.0	10	6.6	0.83						
14.5	7	4.6	0.94						
15.0	4	2.6	1.03						
15.5	2	1.3	1.17						
16.0									
16.5	2	1.3	1.51						
17.0	2	1.3	1.66						
17.5	2	1.3	1.81						
18.0	3	2.0	2.02						
18.5	4	2.6	2.20						

ELECTROFISHING CATCH	4.4/hr	GILL NET CATCH	STD = 10.2/lift STB = 1.5/lift	TRAP NET CATCH	1.1/lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF Black crappie									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0	5	4.7	0.03	1	22.0				
4.5	3	2.8	0.04	1	22.5				
5.0	1	0.9	0.06	1	23.0				
5.5					23.5				
6.0					24.0				
6.5	2	1.9	0.14	2, 3	24.5				
7.0	14	13.1	0.18	2	25.0				
7.5	50	46.7	0.22	2	25.5				
8.0	25	23.4	0.26	2, 3	26.0				
8.5	6	5.6	0.32	2, 3	TOTAL	107			
9.0	1	0.9	0.38	3					
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	5.1/hr	GILL NET CATCH	STD = 2.2/lift STB = 0/lift	TRAP NET CATCH	6.3/lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF White crappie									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5					23.5				
6.0	1	1.4	0.10	2	24.0				
6.5	8	10.8	0.12	2	24.5				
7.0	20	27.0	0.16	2	25.0				
7.5	12	16.2	0.19	2, 3	25.5				
8.0	7	9.5	0.22	2, 3	26.0				
8.5	8	10.8	0.27	2, 3	TOTAL	74			
9.0	10	13.5	0.33	2, 3					
9.5	6	8.1	0.38	2, 3					
10.0									
10.5	2	2.7	0.53	4					
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	0.7/hr	GILL NET CATCH	STD = 0.4/lift STB = 0/lift	TRAP NET CATCH	6.1/lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF White bass									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0	2	11.8	0.05	1	23.0				
5.5	2	11.8	0.07	1, 2	23.5				
6.0	1	5.9	0.10	2	24.0				
6.5					24.5				
7.0					25.0				
7.5					25.5				
8.0	1	5.9	0.22	2	26.0				
8.5					TOTAL	20			
9.0	2	11.8	0.32	2					
9.5									
10.0									
10.5	2	11.8	0.49	2					
11.0	2	11.8	0.57	3					
11.5	1	5.9	0.64	3					
12.0	1	5.9	0.74	3					
12.5	1	5.9	0.86	4					
13.0	1	5.9	0.97	3					
13.5									
14.0	2	11.8	1.14	4, 5					
14.5	1	5.9	1.32	4					
15.0	1	5.9	1.41	5					
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	0.7/hr	GILL NET CATCH	STD = 1.4/lift STB = 0.3/lift	TRAP NET CATCH	0/lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF Striped bass (Standard survey)									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
5.0					23.0				
5.5					23.5				
6.0					24.0				
6.5					24.5				
7.0					25.0				
7.5					25.5				
8.0					26.0				
8.5					26.5				
9.0	1	4.5	0.29	1	27.0				
9.5					27.5				
10.0					28.0				
10.5					28.5				
11.0					29.0				
11.5					29.5				
12.0					30.0	2	8.0	13.00	5
12.5					30.5				
13.0					31.0				
13.5					31.5				
14.0					32.0	1	4.0	14.25	not aged
14.5					32.5				
15.0					33.0	3	12.0	16.00	not aged
15.5					33.5	2	8.0	15.50	not aged
16.0					34.0	3	12.0	17.00	not aged
16.5					34.5				
17.0					35.0	6	24.0	17.38	not aged
17.5					35.5				
18.0					36.0				
18.5					36.5				
19.0					37.0				
19.5					37.5	1	4.0	22.25	8*
20.0	2	9.1	2.87	3					
20.5					TOTAL	22			
21.0	1	4.5	3.71	3					
21.5									
22.0									
22.5									

* otolith

ELECTROFISHING CATCH	0/hr	GILL NET CATCH	STD = 1.1/lift STB = 0.9/lift	TRAP NET CATCH	0/lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF Striped bass (Fall evaluation)									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5	48	34.5	0.02	YOY	21.5				
4.0	79	56.8	0.03	YOY	22.0				
4.5	4	2.9	0.04	YOY	22.5				
5.0	1	0.7	0.07	YOY	23.0	1	0.7	7.79	3
5.5					23.5				
6.0					24.0				
6.5					24.5				
7.0					25.0				
7.5					25.5	1	0.7	7.75	3
8.0					26.0	1	0.7	8.00	3
8.5					26.5				
9.0					27.0				
9.5					27.5				
10.0					28.0				
10.5					28.5				
11.0					29.0				
11.5					29.5				
12.0					30.0				
12.5					30.5				
13.0					31.0				
13.5					31.5				
14.0					32.0				
14.5					32.5				
15.0					33.0	1	0.7	16.00	5
15.5					33.5	1	0.7	15.50	5
16.0					34.0				
16.5					34.5				
17.0					35.0	1	0.7	19.92	not aged
17.5					35.5	1	0.7	20.00	not aged
18.0									
18.5					TOTAL	139			

ELECTROFISHING CATCH	24.3/hr	STB GILL NET CATCH	0.4/lift	TRAP NET CATCH	NA

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF Walleye (Fall evaluation)									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5	1	33.3	4.68	4*
5.0					23.0				
5.5					23.5				
6.0					24.0	1	33.3	5.30	not aged
6.5					24.5				
7.0					25.0				
7.5					25.5				
8.0					26.0				
8.5					TOTAL	3			
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0	1	33.3	1.95	not aged					
17.5									
18.0									
18.5									

* otolith

ELECTROFISHING CATCH	0.2/hr	STB GILL NET CATCH	0.1/lift	TRAP NET CATCH	NA

Species	YEAR	NUMBER	SIZE	BACK CALCULATED LENGTH (in)				
Gizzard shad	CLASS	AGED	RANGE	I	II	III	IV	V
	2005	11	4.4 - 7.0	4.8				
	2004	22	6.0 - 9.5	3.9	6.9			
	2003	8	8.1 - 10.8	4.5	7.7	8.7		
	2002	1	9.2	4.3	6.8	7.6	8.8	

Species	YEAR	NUMBER	SIZE	BACK CALCULATED LENGTH (in)				
White bass	CLASS	AGED	RANGE	I	II	III	IV	V
Intercept=0.7	2005	3	5.0 - 5.5	3.7				
	2004	6	5.6 - 10.7	4.2	7.5			
	2003	4	11.3 - 13.0	5.1	9.1	11.4		
	2002	4	11.3 - 14.8	4.9	10.1	12.0	12.9	
	2001	2	14.1 - 15.0	4.6	8.4	11.9	13.3	14.1

Species	YEAR	NUMBER	SIZE	BACK CALCULATED LENGTH (in)				
Bluegill	CLASS	AGED	RANGE	I	II	III	IV	V
Intercept=0.8	2005	18	1.8 - 4.0	2.9				
	2004	15	4.1 - 6.2	2.0	4.7			
	2003	12	4.3 - 7.8	2.4	4.4	5.6		
	2002	6	6.0 - 7.7	1.9	4.2	5.7	6.5	
	2001	2	6.8 - 7.5	1.9	3.9	4.9	6.2	6.8

Species	YEAR	NUMBER	SIZE	BACK CALCULATED LENGTH (in)				
Striped bass	CLASS	AGED	RANGE	I	II	III	IV	V
Standard Survey	2005	1	9.2	4.3				
	2004							
	2003	3	20.2 - 21.3	5.6	13.1	20.1		
	2002							
	2001	2	30.0 - 30.2	3.9	11.4	16.2	24.7	28.1

Species	YEAR	NUMBER	SIZE	BACK CALCULATED LENGTH (in)				
Largemouth bass	CLASS	AGED	RANGE	I	II	III	IV	V
Intercept=0.8	2005	23	3.6 - 7.1	4.2				
	2004	15	5.9 - 13.5	3.8	8.0			
	2003	14	9.4 - 14.7	4.4	9.0	11.4		
	2002	14	12.0 - 15.8	4.2	9.0	12.2	13.5	
	2001	3	13.8 - 15.6	4.3	8.4	11.4	13.2	14.1

Species	YEAR	NUMBER	SIZE	BACK CALCULATED LENGTH (in)				
Striped bass	CLASS	AGED	RANGE	I	II	III	IV	V
Fall Evaluation	2005							
	2004							
	2003	3	23.1 - 26.4	4.8	12.6	19.7		
	2002							
	2001	2	33.1 - 33.8	11.2	19.1	24.8	28.9	32.5

Species	YEAR	NUMBER	SIZE	BACK CALCULATED LENGTH (in)				
Black crappie	CLASS	AGED	RANGE	I	II	III	IV	V
Intercept=1.4	2005	6	4.1 - 5.1	4.0				
	2004	12	6.5 - 8.5	3.7	6.4			
	2003	6	6.8 - 9.0	3.8	6.6	7.8		

Species	YEAR	NUMBER	SIZE	BACK CALCULATED LENGTH (in)				
White crappie	CLASS	AGED	RANGE	I	II	III	IV	V
Intercept=1.4								
	2004	20	6.3 - 9.6	3.7	6.4			
	2003	11	7.5 - 9.9	3.9	6.5	8.7		
	2002	2	10.5 - 10.6	3.6	6.4	8.2	10.3	

Gizzard shad age-length key

Length group (in)	Total # number	Sub-sample	Age 1	2	3	4	5	6	7	8	9	10	11	12	13
1.0															
1.5															
2.0															
2.5															
3.0															
3.5															
4.0	7	2	7												
4.5															
5.0															
5.5	157	5	157												
6.0	708	3	236	472											
6.5	940	5	752	188											
7.0	215	5	43	172											
7.5	252	5		252											
8.0	214	5		171	43										
8.5	47	6		31	16										
9.0	18	4		5	9	5									
9.5	3	2		2	2										
10.0	1	1			1										
10.5	8	1			8										
11.0															
Total	2570	44	1195	1293	78	5									

Bluegill age-length key

Length group (in)	Total # number	Sub-sample	Age 1	2	3	4	5	6	7	8	9	10	11	12	13
1.0															
1.5	1	1	1												
2.0	12	1	12												
2.5	99	4	99												
3.0	167	5	167												
3.5	111	6	111												
4.0	109	5	22	66	22										
4.5	49	5		49											
5.0	62	5		50	12										
5.5	76	5		30	45										
6.0	111	4		28	28	56									
6.5	95	5			57	19	19								
7.0	60	4			30	30									
7.5	15	3			5	5	5								
8.0															
Total	967	53	411	222	200	110	24								

Largemouth bass age-length key															
Length	Total #	Sub-	Age												
group (in)	number	sample	1	2	3	4	5	6	7	8	9	10	11	12	13
1.0	3	0													
1.5															
2.0															
2.5															
3.0															
3.5	3	2	3												
4.0	5	3	5												
4.5	13	5	13												
5.0	14	5	14												
5.5	12	5	10	2											
6.0	8	3		8											
6.5	10	4	5	5											
7.0	2	2	2												
7.5	1														
8.0	1	1		1											
8.5	1	1		1											
9.0	2	2		1	1										
9.5	3	1		3											
10.0	6	4		5	2										
10.5	1														
11.0	3	3		1	2										
11.5	2	2			2										
12.0	9	3			3	6									
12.5	13	2			13										
13.0	5	3			2	3									
13.5	7	5			4	1	1								
14.0	2	2			1	1									
14.5	7	4			2	5									
15.0	7	2				4	4								
15.5	19	5				15	4								
16.0	10	0													
16.5	5	0													
17.0	6	0													
17.5	4	0													
18.0	5	0													
18.5	2	0													
19.0	2	0													
19.5	2	0													
20.0															
Total	192	69	52	27	31	36	9								

Black crappie age-length key

Length group (in)	Total # number	Sub-sample	Age 1	2	3	4	5	6	7	8	9	10	11	12	13
1.0															
1.5															
2.0															
2.5															
3.0															
3.5															
4.0	5	2	5												
4.5	3	3	3												
5.0	1	1	1												
5.5															
6.0															
6.5	2	2		1	1										
7.0	14	4		14											
7.5	50	4		50											
8.0	25	4		13	13										
8.5	6	3		2	4										
9.0	1	1			1										
9.5															
Total	107	24	9	80	19										

White crappie age-length key

Length group (in)	Total # number	Sub-sample	Age 1	2	3	4	5	6	7	8	9	10	11	12	13
1.0															
1.5															
2.0															
2.5															
3.0															
3.5															
4.0															
4.5															
5.0															
5.5															
6.0	1	1		1											
6.5	8	4		8											
7.0	20	5		20											
7.5	12	4		9	3										
8.0	7	4		5	2										
8.5	8	4		4	4										
9.0	10	5		2	8										
9.5	6	4		2	5										
10.0															

White bass age-length key

Length group (in)	Total # number	Sub-sample	Age 1	2	3	4	5	6	7	8	9	10	11	12	13
1.0															
1.5															
2.0															
2.5															
3.0															
3.5															
4.0															
4.5															
5.0	2	2	2												
5.5	2	2	1	1											
6.0	1	1		1											
6.5															
7.0															
7.5															
8.0	1	1		1											
8.5															
9.0	2	2		2											
9.5															
10.0															
10.5	2	1		2											
11.0	2	2			2										
11.5	1	1			1										
12.0	1	1			1										
12.5	1	1				1									
13.0	1	1			1										
13.5															
14.0	2	2				1	1								
14.5	1	1				1									
15.0	1	1					1								
15.5															
Total	20	19	3	7	5	3	2								

Mean length at Capture

Gizzard shad

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	1195	6.5	0.18	0.01	6.5	6.5
2	1293	7.1	0.63	0.02	7.0	7.1
3	78	8.8	0.63	0.09	8.6	9.0
4	5	9.3	0	0	9.3	9.3

Bluegill

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	411	3.3	0.22	0.02	3.2	3.3
2	222	5.0	0.47	0.05	4.9	5.1
3	200	6.2	0.84	0.06	6.1	6.3
4	110	6.7	0.24	0.05	6.6	6.8
5	24	7.0	0.17	0.09	6.8	7.1

Largemouth bass

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	52	5.3	0.72	0.12	5.0	5.5
2	27	7.8	3.41	0.36	7.1	8.5
3	31	12.6	1.40	0.21	12.2	13.1
4	36	14.6	1.79	0.22	14.2	15.1
5	9	15.2	0.53	0.25	14.7	15.7

Black crappie

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	9	4.5	0.13	0.12	4.3	4.8
2	80	7.8	0.12	0.04	7.7	7.8
3	19	8.3	0.24	0.11	8.1	8.6

White crappie

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1						
2	51	7.6	0.61	0.11	7.4	7.8
3	21	9.0	0.44	0.14	8.7	9.3
4	2	10.8	0	0	10.8	10.8

White bass

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	3	5.4	0.08	0.17	5.1	5.8
2	7	8.6	3.98	0.75	7.1	10.1
3	5	12.0	0.70	0.37	11.2	12.7
4	3	13.9	1.08	0.60	12.7	15.1
5	2	14.8	0.50	0.50	13.8	15.8

Striped bass (Standard Survey)

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	1	9.3	0	0	9.3	9.3
2						
3	3	20.6	0.33	0.33	19.9	21.3
4						
5	2	30.3	0	0	30.3	30.3
6						
7						
8	1	37.4	0	0	37.4	37.4

Striped bass (Fall Evaluation)

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1						
2						
3	3	25.1	0	0	26.3	26.3
4						
5	2	33.5	0.13	0.25	33.0	34.0